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EXAMINER

ZOLLINGER, NATHAN C

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

03/25/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,748	Applicant(s) OHMI, TADAHIRO	
	Examiner NATHAN ZOLLINGER	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 18, 2011 has been entered.

Response to Amendment

The amendment filed on February 18, 2011 has been entered. Claims 1, 5, 7 and 10 have been amended and claim 6 has been cancelled. In light of these and other changes, Examiner withdraws all previous objections and 112 rejections.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: Vacuum apparatus with a single or multi-stage vacuum pump and compressor arrangement.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “gas inlet” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 1-4 and 13 are objected to because of the following informalities: in claim 1, line 9, Applicant uses the phrase “a discharge port of a last-stage vacuum pump of

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said at least one-stage vacuum pump.” This phrasing is somewhat overly complex and Examiner recommends using the simpler phrase of “a discharge port of a last-stage of the vacuum pump of at least one stage.” Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 2, lines 1-3, Applicant uses language which could indicate several possible outcomes. By stating that the number of vacuum stages is set to one or a plurality of stages, Applicant conveys that (1) the number of vacuum stages could be set to one, (2) the number of stages could be set to several or (3) during operation, the number of vacuum stages can be varied between one and many. Examiner believes the possibility of the last option (3) is not covered in Applicant's specification or in the Figures and requests that Applicant amend the claims to preclude this interpretation. Observing the substance of claim 3, it appears a possible amendment to claim 2 might convey that the vacuum apparatus is set to one stage.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10-11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Akutsu (JP2002039061A).

Claim 1: Akutsu discloses a vacuum apparatus comprising a vacuum container (10, 11 or 12) having a gas inlet (paragraph 5, “inlet”) and a gas outlet (A2 of Figure 1); a high vacuum pump (16a) connected to said gas outlet of said vacuum container, wherein said high vacuum pump is configured to operate in a molecular flow region and depressurize the inside of said vacuum container or maintain the inside of said vacuum container in a depressurized state; a vacuum pump (7) of at least one stage connected to a gas outlet of said high vacuum pump; wherein the last stage vacuum pump has an inlet pressure of 10 Torr or less (Drawing 4, at B1, which on page 10 of the English translation lays out a pressure of .6 Torr) and a compressor (19) connected to a discharge port of the last-stage vacuum pump of said at least one-stage vacuum pump without divergence, configured to aspirate all of the gases from the last-stage vacuum pump and depressurize an input side of said compressor (19 would perform as such).

Claims 2-3: Akutsu also discloses a vacuum apparatus wherein the number of vacuum pump stages is set to a plurality of stages (Drawing 4).

Claim 10: Akutsu discloses a vacuum apparatus comprising a container to be depressurized having a gas inlet and a gas outlet (Drawing 4) and introduced with a gas in a supply amount smaller than a predetermined amount (Examiner notes that such an event occurs at the immediate start of the introduction of gas into the container); a first

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vacuum pump (16a) configured to operate in a molecular flow region and maintain for maintaining the inside of said container to be depressurized; a second vacuum pump (7) connected at a subsequent stage of said first vacuum pump, wherein the inlet to the second vacuum pump has an inlet pressure of 10 Torr or less (Drawing 4, at B1, which on page 10 of the English translation lays out a pressure of .6 Torr); and a compressor (19) connected to said second vacuum pump without divergence, wherein the compressor is configured to aspirate all of gases from the second vacuum pump.

Claim 11: Akutsu also discloses a vacuum apparatus wherein said first vacuum pump is a turbomolecular pump (paragraph 9) or a thread groove pump, and said second vacuum pump is a booster pump (paragraph 33).

Claim 13: Akutsu also discloses a vacuum apparatus wherein the vacuum pump connected to said compressor is a screw pump (paragraph 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gebele (US 5,228,838).

Claim 1: In Figure 1, Gebele discloses a vacuum apparatus comprising a vacuum container (5) having a gas inlet (2) and a gas outlet (line to 15); a high vacuum

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pump (12) connected to said gas outlet of said vacuum container, wherein said high vacuum pump is configured to operate in a molecular flow region and depressurize the inside of said vacuum container or maintain the inside of said vacuum container in a depressurized state; a vacuum pump (9) of at least one stage connected to a gas outlet of said high vacuum pump; and a compressor (11) connected to a discharge port of the last-stage vacuum pump of said at least one-stage vacuum pump without divergence, configured to aspirate all of the gases from the last-stage vacuum pump and depressurize an input side of said compressor (11 would perform as such).

Examiner notes that while Gebele does not explicitly state that the last stage vacuum pump has an inlet pressure of 10 Torr or less, Gebele is clearly describing an apparatus which operates in this pressure range (Examiner notes the suction capacity of the pump train disclosed in col. 1, lines 43-44, which range is entirely less than 10 Torr). It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the last-stage pump has an inlet pressure of 10 Torr or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 10: In Figure 1, Gebele discloses a vacuum apparatus comprising a container (5) to be depressurized having a gas inlet (2) and a gas outlet (line to 15) and introduced with a gas in a supply amount smaller than a predetermined amount; a first vacuum pump (12) configured to operate in a molecular flow region and maintain for

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maintaining the inside of said container to be depressurized; a second vacuum pump (9) connected at a subsequent stage of said first vacuum pump; and a compressor (11) connected to said second vacuum pump without divergence, wherein the compressor is configured to aspirate all of gases from the second vacuum pump.

Examiner notes that while Gebele does not explicitly state that the second vacuum pump has an inlet pressure of 10 Torr or less, Gebele is clearly describing an apparatus which operates in this pressure range (Examiner notes the suction capacity of the pump train disclosed in col. 1, lines 43-44, which range is entirely less than 10 Torr). It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the second vacuum pump has an inlet pressure of 10 Torr or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claims 1 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conrad (US 7,033,142).

Claim 1: Conrad discloses a vacuum apparatus comprising a vacuum container (2) having a gas inlet and a gas outlet; a high vacuum pump (3 or 4) connected to said gas outlet of said vacuum container, wherein said high vacuum pump is configured to operate in a molecular flow region and depressurize the inside of said vacuum container or maintain the inside of said vacuum container in a depressurized state; a vacuum pump (6) of at least one stage connected to a gas outlet of said high vacuum pump; and

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a compressor (8 or 9) connected to a discharge port of the last-stage vacuum pump of said at least one-stage vacuum pump without divergence, configured to aspirate all of the gases from the last-stage vacuum pump and depressurize an input side of said compressor (8-9 would perform as such).

Examiner notes that while Conrad does not explicitly state that the last stage vacuum pump has an inlet pressure of 10 Torr or less it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the last-stage pump has an inlet pressure of 10 Torr or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 10: Conrad discloses a vacuum apparatus comprising a container (2) to be depressurized having a gas inlet and a gas outlet and introduced with a gas in a supply amount smaller than a predetermined amount (Examiner notes that the receiver must have an inlet to introduce gases and that the introduced gases will necessarily be less than the a predetermined amount, the predetermined amount being the container or apparatus which supplies the receiver, which will retain a portion, however small of the introduced gases); a first vacuum pump (3 or 4) configured to operate in a molecular flow region and maintain for maintaining the inside of said container to be depressurized; a second vacuum pump (6) connected at a subsequent stage of said first vacuum pump, wherein the second vacuum pump has an inlet pressure of 10 Torr or less (Examiner notes the suction capacity of the pump train disclosed in col. 1, lines

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43-44, which range is entirely less than 10 Torr); and a compressor (8 or 9) connected to said second vacuum pump without divergence, wherein the compressor is configured to aspirate all of gases from the second vacuum pump.

Examiner notes that while Conrad does not explicitly state that the last stage vacuum pump has an inlet pressure of 10 Torr or less it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the last-stage pump has an inlet pressure of 10 Torr or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claims 4, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akutsu (JP2002039061A), Conrad (US 7,033,142) or Gebele (US 5,228,838) in view of Maruyama (JP09321021), Puech (US 6,644,931) or Smith (US 5,925,167).

Claims 4, 9 and 12: Akutsu, Conrad or Gebele disclose the limitations of claims 1, 7 or 10, respectively. Akutsu, Conrad or Gebele do not disclose a gas recovery apparatus configured to recover a gas discharged from said last-stage vacuum pump. Maruyama teaches a gas recovery apparatus (Drawing 5, 54 or 55; Drawing 1, 4, 5 or 10; Examiner notes that pump 4 or 54 could broadly be interpreted to be a gas recovery apparatus). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ a gas recovery apparatus as taught by Maruyama into the apparatus of Akutsu in order to separate out unnecessary byproducts from the exhaust air. Alternatively, Puech teaches a gas recycling

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apparatus (10) at the terminal end of the main and auxiliary pumps, 1 and 6, respectively. Independent of these pumps, Puech teaches that this recycling system "generates a recycled gas flow...directed via a recycling pipe to a controlled gas supply" (col. 5, lines 16-18). Such "generation" would necessarily come by way of an additional pump or compressor within the gas recycling apparatus. It follows, then, that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ a gas recovery system as taught by Puech into the apparatus of Akutsu in order to reuse gases, making repurchase of costly gases unnecessary. As a further alternative, Smith teaches a gas recovery apparatus (27 or 28) used to treat exiting gases. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ a gas recovery apparatus as taught by Smith into the apparatus of Akutsu in order to prevent harmful gases from escaping into the atmosphere.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conrad (US 7,033,142).

Claim 7: Conrad discloses a vacuum apparatus comprising a container (2) to be depressurized having a gas inlet and a gas outlet; a first vacuum pump (3 or 4) configured to operate in a molecular flow region and maintain for maintaining the inside of said container to be depressurized; a second vacuum pump (6) connected at a subsequent stage of said first vacuum pump; a third vacuum pump (8) connected at a subsequent stage of said second vacuum pump; and a compressor (9) connected to

said third vacuum pump without divergence, wherein the compressor is configured to aspirate all of gases from the third vacuum pump.

Conrad discloses the claimed invention except for operating a last-stage pump at with an inlet pressure of 10 Torr or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the last-stage pump has an inlet pressure of 10 Torr, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 8: Conrad further discloses a vacuum apparatus wherein said first vacuum pump is a turbomolecular pump (col. 1, lines 11-13) or a thread groove pump, and said second vacuum pump is a booster pump (col. 2, lines 63-65), said third vacuum pump being a dry pump (col. 1, lines 15-20).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US 5,925,167).

Claim 5: Smith discloses a vacuum apparatus comprising a vacuum container to be depressurized having a gas inlet and a gas outlet (Fig. 2, 10-13); a high vacuum pump (14-17) connected to said gas outlet of said vacuum container, wherein said high vacuum pump is configured to operate in a molecular flow region and depressurize the inside of said vacuum container or maintain the inside of said vacuum container in a depressurized state; vacuum pumps of a plurality of stages (18-21) connected to said high vacuum pump (and exhausted either through 26 or pathway "D"); and a gas

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recovery apparatus (28) configured to recover a gas discharged from the last-stage vacuum pump of said vacuum pumps for re-use of said gas; wherein said vacuum apparatus further comprises a gas recovery compressor (27), connected to a discharge port of said last-stage vacuum pump without divergence, wherein said compressor is configured to aspirate all of gases from the last-stage vacuum pump and assist a depressurization operation of said last-stage vacuum pump and suppressing back diffusion from said discharge port, and said gas recovery compressor serves as said gas recovery apparatus (Fig. 2). Examiner also notes that in an alternative interpretation, the gases exhausted through 18-21 may also exit along pathway "D" to a gas recovery apparatus (gases are "collectively or individually treated"). The figure lacks a compressor along the "D" pathway but Examiner suggests that a compressor, 27, could be incorporated just as 27 is utilized along exit route 26 to re-pressurize exit gases to increase the flow of gases to the recovery apparatus. In this context, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ a gas recovery compressor disclosed in Figure 2 (27) to improve the exit flow of the exhaust gases exiting pathway D.

Smith discloses the claimed invention except for operating a last-stage pump at with an inlet pressure of 10 Torr or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust operating parameters of the vacuum pump train such that the last-stage pump has an inlet pressure of 10 Torr, since it has been held that where the general conditions of a claim

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are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Response to Arguments

Applicant's arguments filed October 20, 2010 have been fully considered but they are not persuasive. In response to Applicant's requirement that Examiner show evidence that a vacuum pump qualifies as a compressor, Examiner preemptively calls attention to Applicant's specification, namely paragraph 22, in which Applicant asserts "it can also be said that the compressor additionally attached to the discharge port of the last-stage pump, particularly the discharge port exposed to the atmospheric side, has the function of a vacuum pump." Moreover, in reference to the drawings in paragraph 42, Applicant further refers to the compressors "having a vacuum pump function that can assist the depressurization operation." It is well-known that Examiner may make reasonable interpretations of the claims in light of the Applicant's specification. It appears that Applicant's specification blurs the distinction between a compressor and a vacuum pump, explicitly stating that a compressor can be a vacuum pump. So can a vacuum pump be a compressor? Beyond Applicant's specification, Examiner notes that broadly speaking, a compressor or a vacuum pump are somewhat interchangeable terms in the sense that each reduces pressure near the inlet (vacuum region) and increases pressure at the outlet (compressed region). To say that a vacuum pump cannot be a compressor in the general sense of the word is somewhat mistaken, since the vacuum pump, which might operate at high vacuum pressures,

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nevertheless "compresses" a medium to a higher pressure at its outlet. Acknowledging these observations, Examiner's concludes that treating a fore-pump or a rough vacuum pump or a vacuum pump as a compressor is proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN ZOLLINGER whose telephone number is 571-270-7815. The examiner can normally be reached on Monday - Thursday, 9 a.m. - 4 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/

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/N. Z./
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